AMENDMENT AND RESPONSE UNDER 37 C.F.R. § 1.116

Serial Number: 10/043,591

Filing Date: January 9, 2002

Title: METHOD AND APPARATUS FOR AUDIO LOUDNESS & DYNAMICS MATCHING

Page 3 Dkt: 2045.267US1

IN THE CLAIMS

Please amend the claims as follows:

1-21. (Cancelled)

22. (Currently Amended) A method of adjusting the dynamics of an audio track a digital audio

track, the method implemented on a computerized system, comprising:

evaluating an audio track to determine the loudness levels of a plurality of frames in the

audio track such that the loudness levels of the plurality of frames are representative of the

loudness distribution of frames across the entire audio track;

determining an apparent loudness weighting for the plurality of frames of the audio track

such that the weighting emphasizes the relatively greater effect that louder frames have on

loudness perception, while including the contribution to overall loudness made by less loud

frames; and

adjusting the loudness of the track based on the determined loudness levels and apparent

loudness weighting of the plurality of frames so that the apparent loudness of the track matches a

desired apparent loudness.

23. (Currently Amended) The method of adjusting the dynamics of an audio track a digital

audio track of claim 22, wherein evaluating an audio track to determine the distribution of

loudness levels present in the audio track comprises determining levels for all frames comprising

the audio track.

24. (Currently Amended) The method of adjusting the dynamics of an audio track a digital

audio track of claim 22, wherein evaluating an audio track to determine loudness levels for a

plurality of frames in the audio track comprises determining levels for frames sampled from

across all frames comprising the audio track.

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Page 4 Dkt: 2045.267US1

25. (Currently Amended) The method of adjusting the dynamics of an audio track a digital

audio track of claim 22, wherein evaluating an audio track to determine loudness levels for a

plurality of frames in the audio track comprises determining levels for all frames in the audio

track.

26. (Currently Amended) The method of adjusting the dynamics of an audio track a digital

<u>audio track</u> of claim 22, further comprising using an emphasis parameter to derive the apparent

loudness weight of an individual frame of the audio track such that the apparent loudness weight

comprises the emphasis parameter raised to the negative power of a loudness value for the frame.

27 (Currently Amended) The method of adjusting the dynamics of an audio track of claim

22, wherein at least one of evaluating an audio track to determine the loudness levels of a

plurality of frames and determining an apparent loudness weighting for the plurality of frames

comprises performing such calculations based on loudness value distribution information for the

audio track represented in a histogram.

28. (Currently Amended) The method of adjusting the dynamics of an audio track a digital

audio track of claim 22, wherein the apparent loudness weight is frequency-weighted to

compensate for perceived loudness differences at different frequencies.

29. (Currently Amended) The method of adjusting the dynamics of an audio track a digital

audio track of claim 22, wherein adjusting the loudness of the track comprises combining

aggregated weighted loudness values to determine apparent loudness for the track.

30. (Currently Amended) A method of adjusting the dynamics of an audio track a digital audio track, the method implemented on a computerized system, comprising:

evaluating an audio track to determine the loudness levels of a plurality of frames in the audio track such that the loudness levels of the plurality of frames are representative of the loudness distribution of frames across the entire audio track;

using the loudness levels of a plurality of frames in the audio track to calculate a dynamic spread of the audio track;

determining a non-linear compressor transfer function configured to produce a desired dynamic spread, the non-linear compressor transfer function comprising greater dynamic range compression at high loudness levels that at low loudness levels; and

applying the determined non-linear compressor transfer function to the audio track to produce an audio track with the desired dynamic spread.

- 31. (Currently Amended) The method of adjusting the dynamics of an audio track a digital audio track of claim 30, further comprising adjusting the loudness of the track based on the determined loudness levels so that the apparent loudness of the track matches a desired apparent loudness.
- 32. (Currently Amended) The method of adjusting the dynamics of an audio track a digital audio track of claim 30, wherein a threshold between linear segments of the non-linear compressor transfer function is based on statistical analysis of audio track
- The method of adjusting the dynamics of an audio track a digital 33. (Currently Amended) audio track of claim 32, wherein the threshold is at specified percentile domain of loudness levels in the audio track.
- 34. (Currently Amended) The method of adjusting the dynamics of an audio track a digital audio track of claim 32, further comprising normalizing the loudness of the specified percentile domain of loudness levels in audio track to a desired loudness level.

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Title: METHOD AND APPARATUS FOR AUDIO LOUDNESS & DYNAMICS MATCHING

Page 6 Dkt: 2045.267US1

35. (Currently Amended) The method of adjusting the dynamics of an audio track a digital audio track of claim 30, wherein determining a non-linear compressor transfer function configured to produce a desired dynamic spread comprises estimation of dynamic spread on the audio track with a calculated non-linear compressor transfer function applied by applying the calculated non-linear compressor transfer function to at least one of histogram or sample frame data.

36. (Currently Amended) The method of adjusting the dynamics of an audio track a digital audio track of claim 35, wherein the non-linear compressor transfer function is iteratively calculated to achieve a desired dynamic spread.